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(12) **United States Patent**  
**Dow et al.**

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(54) **SEPARATED FLOW LIQUID CATHOLYTE  
ALUMINUM HYDROGEN PEROXIDE  
SEAWATER SEMI FUEL CELL**

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(57) **ABSTRACT**

The present invention relates to an improved semi-fuel cell and an improved cathode used therein. The semi-fuel cell stack comprises a housing, an anode within the housing, a porous cathode within the housing, an aqueous catholyte within the housing, an aqueous anolyte stream flowing in the housing, and a membrane for preventing migration of the catholyte through the porous cathode and into the anolyte stream. In a preferred embodiment of the present invention, the catholyte comprises an aqueous hydrogen peroxide solution, the anolyte comprises a NaOH/seawater solution, and the membrane permits passage of OH<sup>-</sup> ions while inhibiting the passage of hydrogen peroxide. The membrane is attached to a surface of the cathode or alternatively, impregnated into the cathode.

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H01M 6/20; H01M 6/30; H01M 6/34

(52) **U.S. Cl.** ..... **429/105**; 429/110; 429/119

(58) **Field of Search** ..... 429/105, 110,  
429/119

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**16 Claims, 2 Drawing Sheets**

